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CENTRAL INTELLIGENCE AGENCY

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fertilizers in 1961 by increasing the 1960 production goals for ammonium sulfate by one and half times and for ammonium nitrate and calcium cyanamide by two times. The 1960 chemical fertilizer production goals were set as follows:

Ammonium sulfate	370,000 tons
Ammonium nitrate	300,000 tons
Calcium cyanamide	100,000 tons
Phosphorus fertilizer	300,000 tons

In order to step up the production of phosphorus fertilizer, the NK government was expected to make most of every available resource by earmarking all the NK produce of apatite for fertilizer production and collecting slags (iron phosphide) from various ironworks and steel ⁿmines. The Ammonium Sulfate

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Plant of the Hungnam Fertilizer Factory was working on an expansion project to add two new nitrogen fixation compression towers to its existing two towers in October 1959. This project was due to be completed by the spring of 1960. The existing towers were made in the USSR, in imitation of which the two new towers were manufactured by the Nagwon Machine Manufactory. Their designed capacity was said to be the same as those of Soviet make.

The Pon'gung Chemical Factory was operating two calciners for production of calcium cyanamide, and was planning to add to them five new calciners in 1961. It annually produced 100,000 tons of calcium cyanamide from 1957 to 1960. The main producer of phosphorus fertilizer in NK was the Sunch'on Chemical Factory, whose 1960 production goal was 300,000 tons. Though it was unknown what expansion program this factory had, the NK government appeared to be making efforts to raise the production amount of phosphate as much as nitrate fertilizers. For instance, it was under consideration to set up a factory for production of phosphate of lime from apatite which was abundant in the Sukch'on area of P'yongan-namdo. The probable site for this factory was Namp'o in P'yongan-namdo. This factory was said to be additionally installed with a system for compounding various fertilizers.

In the production of chemical fertilizers, NK had no particular bottlenecks, except that the existing production facilities were incapable of handling the entire NK produce of lime stones and apatites. Therefore, what was needed for greater production of chemical fertilizers was the expansion of production facilities rather than the improvement of techniques. As recently as the spring of 1960, NK produced no potassium fertilizer.

The Chemistry Department of the KIM Il-song University succeeded in its experiment to extract potassium from bittern in 1959. This success was not translated into production for the reason that it was impossible to obtain enough bittern for fertilizer production. Potassium fertilizer was annually imported in an unknown amount from abroad. In substitution for potassium fertilizer, NK farmers were supplied with seaweed and with chimney dust collected at various smelters and ironworks. NK was unable to produce potassium fertilizer for the main reason that there were no raw materials for potassium production in NK. No urea fertilizer was produced in NK, nor was there any plan to produce it. In actuality, the

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NK government was trying to augment the variety of chemical fertilizers. However, affected much by the present situation in which the NK fertilizer industry was mostly engaged in producing nitrate fertilizer, the NK government was more concerned with the expansion of the existing production facilities than with the urea fertilizer. The Hungnam Fertilizer Factory was nonetheless conducting research work on urea fertilizer.

2. The carbide produced by the Ch'ongsu Chemical Factory accounted for the most part of exported carbide. NK exported carbide to the Soviet Union and China in unknown amounts. China was known to use the carbide for manufacturing synthetic fibre. In exporting carbide to such countries, NK transported drums of carbide by railroad. The packing method was so poor that an accident in which a load of carbide exploded on the way of transportation took place in 1959. As of 1960, NK had no facilities for production of synthetic rubber. However, organic chemistry students of the KIM Il-song University, led by Teacher KIM Kil-chae (6855/0679/0961), succeeded in developing synthetic rubber from carbide. In an effort to translate this development into production, a group of technicians from the Chemistry Research Center of the North Korean Science Academy as well as the KIM Il-song University was trying to design a pilot plant at the Hungnam Vinalon Factory, where synthetic fibre is now being made from carbide. In parallel with this project, synthetic rubber was under study in such places as the Central Research Station of the Ministry of Light Industry, the Central Research Station of the Ministry of Chemical Industry, and the P'yongyang Rubber Factory. Rubber, natural and synthetic, was mostly imported from the Soviet Union in an unknown amount. The P'yongyang Rubber Factory was engaged in reclaiming used rubber. In NK tires were manufactured by the Tokch'on Automotive Factory and the P'yongyang Rubber Factory. The Tokch'on Automotive Factory was capable of supplying enough tires for its automotive products. Its 1961 production goal was said to be 10,000 trucks. The P'yongyang Rubber Factory produced tires in a very limited amount. The tires produced in NK were manufactured from natural rubber, and they were said to wear faster than those of foreign make. In order to cover up the

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tire shortage, NK annually imported from the Soviet Union an unknown amount of tires.

3. The following is information on the production of various chemical compounds in NK.

- A. Nitric Acid: This chemical compound was mostly produced by the Ch'ongsu Chemical Factory, the Sunch'on Chemical Factory, and the P'yongyang Chemical ~~Rax~~ Agents Factory. Of these producers, the Ch'ongsu Chemical Factory produced more nitric acid than the others, whereas the P'yongyang Chemical Agents Factory produced the best in quality. The NK nitric acid was fit for industrial purposes, and NK produced nitric acid enough to meet its industrial demand. On the contrary, the NK nitric acid was so poor in quality that it could not be used for chemical analysis. For this purpose, NK had to import annually nitric acid of high quality from the Soviet Union and China. In 1959 NK imported 150 tons of high quality nitric acid from the Soviet Union, an amount which was barely enough to cover one third of the required total supply.
- B. Ammonia: In NK ammonia was mostly produced by the Hungnam Fertilizer Factory more than required for the entire NK chemical industry. However, the NK ammonia was poor in quality, and for this reason it could not be exported. The NK ammonia was chiefly used for manufacturing nitrate fertilizers, nitric acid, and dye stuffs, and for refrigeration. Ammonia in liquid or gas form was annually imported from the Soviet Union for chemical analysis purposes. The liquid ammonia was contained in steel tube, and each tube of liquid ammonia was enough to make 200 kilograms of 30 percent ammonia solution.
- C. Methanol: Methanol was chiefly produced by the Sinuiju Solvents Factory in unknown quantities. The Kilchu Pulp Factory also produced a limited amount of methanol and ethanol. As far as methanol was concerned, there were no exports and imports. The Sinuiju Solvents Factory was installed with an alcohol distilling tower, by means of which an unknown amount of high quality methanol and ethanol ~~was~~ ^{were} obtained. These products were chiefly used for making solvents.
- D. Sulfuric Acid: Sulfuric acid was mostly manufactured by the Hungnam Fertilizer Factory, Ch'ongsu Chemical Factory, Sunch'on Chemical

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Factory, and P'yongyang Chemical Agents Factory. Of these producers, the Hungnam Fertilizer Factory and the Ch'ongsu Chemical Factory led the others in production amount. These factories produced sulfuric acid for making such items as staple fibre, celluloids, and explosives. NK produced enough sulfuric acid to meet the above industrial demands. On the contrary, NK had to import from the Soviet Union ^(unknown) an unknown amount of high quality sulfuric acid annually for chemical analysis purposes.

- E. Hydrochloric Acid: This chemical item was mostly produced by the Pon'gung Chemical Factory, the Ch'ongsu Chemical Factory, and the P'yongyang Chemical Agents Factory. Most of the hydrochloric acid produced in NK was used in making hexachlorine, and food stuffs, and the production amount was sufficient to cover the NK industrial demand. For laboratory use, high quality hydrochloric acid was annually imported from the Soviet Union. In 1959, NK imported 150 tons of hydrochloric acid, which was about 30 percent of the NK laboratory consumption.
- F. Ammonium Nitrate: Ammonium nitrate was chiefly manufactured by the P'yongyang Chemical Agents Factory for unknown purposes. For laboratory use, an unknown amount of ammonium nitrate was imported from the Soviet Union each year.
- G. Yellow phosphorus: There was a factory engaged in manufacturing safety powder in Sinuiju. This factory was presumed to be also manufacturing yellow phosphorus. No further information.
- H. Chlorine: This item was said to be manufactured by the Pon'gung Chemical Factory in a limited amount.
- I. Soda Ash: Soda ash was also produced by the Pon'gung Chemical Factory mostly for use in making glass and soap. An unknown amount of the NK soda ash was annually exported to China.
- J. Carbon Black: An unknown amount of carbon black (acetyleneblack) was produced by the Pon'gung Chemical Factory. The carbon black was mostly used in making dye stuffs which were used in coloring rubber products.
- K. Penicillin: The NK Medical Academy succeeded in making penicillin in 1958. Before this, the Medical Academy, sometime after the Korean War,

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sent several research workers to Czechoslovakia for training in penicillin manufacturing. After returning to NK, they failed to make the drug, thereupon falsely claiming that they succeeded with the penicillin which they had brought from Czechoslovakia for research purposes. The P'yongyang Pharmaceutical Factory was producing a limited amount of penicillin. In NK penicillin was in short supply, and in order to cover up the shortage, NK was importing from the Soviet Union and East Germany.

4. As a whole, the NK chemical industry was capable of producing such basic chemicals as various acids and alkalis in sufficient quantities. However, their quality was so poor that NK had to import them from abroad. In order to solve this problem, NK set up the P'yongyang Chemical Agents Factory in 1959, which was so designed as to produce such chemical compounds as hydrochloric acid, sulfuric acid, phosphorus acid, nitric acid, and caustic soda in unknown quantities. These products improved much in quality, as compared with those which had been produced in NK. However, their quality was not still good enough for analytical use at laboratories. Furthermore, its production capacity was not enough to meet the entire NK demand for such items, and therefore, NK still had to import them from abroad.
5. In parallel with the expansion of the chemical industry, the NK government was trying to secure necessary chemical technicians and skilled workers. In 1960, the Hungnam Chemical Engineering College was expanded to become the Hamhung Combined Chemical Engineering College. The NK government had been annually sending an average of 500 NK students and others for training to such countries as the Soviet Union, Czechoslovakia, East Germany, and Hungary. About one third of them were known to be engaged in the chemical field, particularly synthetic chemistry. For on-the-job training, many factories were running two types of three year course night schools, one designed for unskilled workers with education of junior middle school and the other for semi-skilled workers with education of senior middle school. In addition, the NK government established several chemical technical schools in such places as Pon'gung, Hungnam, and Tanch'on in Hamgyong-namdo; Aoji, Songjin, and Ch'ongjin in Hamgyong-pukto; and Ch'ongsu in P'yongan-pukto. These

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schools were designed to train for three years senior middle school graduates for jobs at chemical factories. Of the above schools, those located in Tanch'on, Songjin, and Aoji were merely added with a new course for chemical training. Each school was capable of graduating 60 to 150 chemical skilled workers. For the training of chemical technicians, there were the Ch'ongsu and Hungnam Chemical Professional Schools, each of which graduated an average of 200 chemical technicians each year.

6. After 1957, when foreign aid to NK virtually came to an end, NK had to purchase required chemical equipment and chemical compounds out of its own foreign currency reserve from such countries as East Germany Czechoslovakia, and the USSR. Of all the foreign equipment, Soviet-made items were dominant until 1958, when this trend changed to the extent that Czechoslovakia was leading the other countries in 1960. In importing such chemical equipment and compounds, NK was required to pay in cash. There appeared ^{few} ~~few~~ deals by barter or on credit. In foreign trade, what was most troubling the NK government was the fact that all the other countries with which NK was trading were operating under their own planned economic system. Unless NK sent orders to them in accordance with a list of its future requirements in equipment and other items one or more years ahead of their actual use, it was hardly possible to obtain the required items in time, for the manufacturing country had to put the NK ordered items in its production plan. Therefore, most of NK industrial facilities were obliged to spend months preparing such a list towards the end of each year. In actuality, NK factories and other enterprises were unable to foresee every future requirement. As a result, there were times when some factories were hampered by the unavailability of certain materials, equipment, and machine parts.
7. Regarding the supply of chemical raw materials in NK, there appeared no bottlenecks in particular. What was weighing most in the NK chemical industry was power supply, which was, as of 1960, presumed to be sufficient for the normal operation and anticipated future development of the chemical industry. For the NK chemical industry, which could be said to be still


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in its infancy, NK chemical engineers, though far from being satisfactory in number and techniques, were believed to be capable of operating existing chemical production facilities. As a whole, the NK industry was estimated to have a total of about 10,000 qualified engineers, of whom only 500 were engaged in the chemical field. The NK government was planning to multiply that number up to seven times in seven years, with a greater emphasis on chemical engineers. Most chemical production facilities now in operation in NK were what had been brought in free aid from Communist countries until 1957. However, they were so designed and so manufactured with special considerations as to best fit the NK conditions. For this reason, there had been no notable instance in which such foreign made equipment was



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Regarding the barter trade,

NK exported

apples to the Soviet Union in exchange for gasoline on a barter basis.

In order to promote this trade, NK executed a plan to expand the entire NK fruit cultivation acreage to 100,000 Chongbo (roughly 100,000 hectares) in 1958, which was still in progress in 1960. As a result of the apple barter, there were times when no apples were available at market in NK.

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